

January 2016

## American Eel: A Symposium. Session Six

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### Recommended Citation

Dr. William Bradnee Chambers, Dr. David Freestone, Charles Norchi, Jeff Thaler & Dr. David VanderZwaag, *American Eel: A Symposium. Session Six*, 21 *Ocean & Coastal L.J.* 143 (2016).

Available at: <http://digitalcommons.maine.edu/oclj/vol21/iss1/9>

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**AMERICAN EEL: A SYMPOSIUM**  
**SESSION SIX: FUTURE DIRECTIONS AND CONCLUDING REMARKS**

***Keynote Speaker & Panelist:***

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**GLOBAL PERSPECTIVE ON MIGRATORY SPECIES**

**Bradnee Chambers:**

What I hope to do today is to give you a bit of a flavor of what CMS (Convention for Migratory Species of Wild Animals) is about. I want to put it into the context of the European eel. Because I also want you, as I go through my presentation, to look at CMS as a possible option for governance of the American eel as well. So without further ado, I will get right into it.

One of the key reasons that the American eel is in trouble is that it is migratory and migratory species generally cross international boundaries. It cannot be fully protected by one country. It requires cooperation. This is why CMS is so important internationally. We have so many species that move between international boundaries. The CMS defines migratory species as the entire population, or geographically separate part of the population of any species, a significant portion of whose members predictably or cyclically cross one or more national or jurisdictional boundaries. The American eel meets this definition as does the European eel – which I will talk about a bit later, that was listed under Appendix II of CMS last year.

CMS is a global treaty. I like to say it is one of the “Big 5.” It comes from the original framework of international and environmental treaties. The “Big 5” are the Convention on Biological Diversity, the Ramsar Wetlands Convention, CITES, the World Heritage Convention, and of course, the CMS.

We cover all migratory wild animals. I like to say from big species, such as whales, all the way to butterflies. Just to give you a flavor, we cover elephants, sturgeons, wild dogs, antelopes, snow leopards, small cetaceans, sharks, rays, and eels. It is a convention that deals both with the species itself, but it also deals with the habitat as being an integral part of protecting the species.

It has two appendices. It is not a very complex convention. Basically, if a species is put on Appendix II, it requires the range states to work cooperatively to come up with a strategy to be able to manage and conserve that particular species. Some examples that we have on Appendix II would include European eel, the polar bear, hammer-head sharks, and some other silky sharks. It

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is by far where most of our species find themselves in terms of the convention. It is also very interesting because when you [are considering putting] a particular species on to the appendices, you do not have to put the entire species there, you can put a population or sub-population. Appendix I is the strictest obligation that we have under the convention. It basically means that [there is] no taking, at all. It requires a strict management regime, and enforcement regimes at the national level. The only exceptions are for scientific purposes and for indigenous and traditional hunting.

The CMS is quite a very broad, umbrella agreement. At its core is [the Convention text], but under the CMS [umbrella there are] a number of different binding, ratified agreements. This just gives you some of them: the ASCOBANS, which works on small cetaceans in the northern and Irish seas; ACOBAMS works on the small cetaceans in the Mediterranean; AEWB is one of our larger agreements, it works on European, African, Eurasian water birds; we have one called EUROBATS, that works on bats in Europe but also in parts of North Africa; we have an agreement on albatrosses and petrels, ACAP, it is based in Hobart; and we have two others that are the executive secretary for the Gorilla agreement as well, and for ASCOBANS. But then we have the Wadden Sea Seal Agreement, which is managing the seals populates in the Northern part of Europe.

I want to come back later on because I want to discuss the flexibility that the treaty offers, but we also have different MOUs. These are soft law instruments between range states of a particular species. There are nineteen of them. They range from aquatic waterbirds to aquatic mammals to Siberian cranes – all sorts of different species. Two of the MOUs are global MOUs that have quite a large number of countries. One of them, sharks, is growing bigger and bigger every day; and the other is raptors, which deals with birds of prey.

It is an important convention because migratory species are very highly threatened. Fifty percent of migratory and potentially migratory species are threatened, compared to about just twenty-seven percent of non-migratory ones. This gives you a flavor of what we are facing in terms of threats. Water birds at the global level, about forty percent of the known populations are declining. Nearly half of the 95 migratory species of sharks are in high-risk. And there are some sharks, such as hammer-heads, porbeagles and oceanic whitetips which have seriously declined [during] the last 50 years. Whales, with the exception of a few species, have been in decline for years. Of the seven marine turtles that we have, five of them are listed on the IUCN red list as “endangered species” or “critically endangered species.” I am sure that if you follow the news magazines or what is happening in terms of the international conservation world, you know that we are in the middle of a very serious poaching crisis that is going on. We have seen elephant and rhino populations completely depleted. Elephants, for example, [in ten years] went from about 1.1 million to about 500,000. Almost one hundred elephants a day are being poached for ivory.

We deal with species, but we are also dealing with some major global issues. Of course, we deal with migration. We try to protect probably one of the great phenomena of nature, the great migrations that you see on the Serengeti, the incredible journeys that we see such as the European eel or some of our green turtles. So, this is another integral part of our work that we are working on it every day. But we are also very much linked into the whole U.N. and Biodiversity framework that exists internationally. We work very hard in the negotiations of the sustainable development goals (SDGs) to ensure that we have a strong biodiversity goal, that is Goal 15. And we also have a lot of input into Goal 14 on oceans.

We are linked — all of the biodiversity conventions are linked – to the Aichi Targets. So we have the SDG framework for the Aichi Targets, which has a number of specific targets, and

then all of our work is directly linked to those Aichi Targets and they [in turn] are linked into the U.N. Sustainable Development Goals. For the first time you will see a very strong international framework for biodiversity, and that is being linked into the whole bio-development agenda within the U.N.

We also work on big ticket issues such as renewable energy. Some of you might say why is a convention such as this working on renewable energy? Well, it is a big threat to our species. Renewable energy has replaced nuclear. It is growing hand over foot every day. But, if it is not deployed in a very safe way for a species, it causes huge numbers of conflicts. So we have been working with the International Agency for Renewable Energy and some other international treaties to make sure we can get into environment impact assessments and international planning. Just things that make sense — do not put wind turbines in a bird migratory route, or [leave] an interval between the turbines that the birds can pass. We are working on illegal wildlife crime. We work closely with CITES. CITES works on the trade dimension. We work very much on the national side of that, national enforcement. We do not have as much to do as CITES on elephants, but we do have other species that are highly threatened from poaching like sea turtles. But also [we have a major problem in Europe, with the migrations of] many of our birds, we have a major problem in Europe right now, with the migrations. Given all the political instability we have in North Africa, a lot of the conservation regulations are not being enforced. And one of them is the bird trapping. Basically, during the migration periods there is 1,000 kilometers of netting being put on the northern coasts and it is just indiscriminately taking birds. Last year, Bird Life International estimated that in the spring migration, about twenty million birds — song birds — were taken. We are still trying to understand the impact. Barriers to migration is another [issue]; we work on trying to develop infrastructure guidelines for mining, for railways, for large scale projects, that take into consideration migratory paths, and make governments understand that if you put a wire fence for the migration of the zynga antelope or another species like that, that you are basically restricting them, and that the population, as a result, could perish.

Overall we like to think of ourselves as a Counsel General for migratory species. We help them get the necessary travel passports to be able to move within the range of their migrations. We work with countries to ensure that that is enforced.

I think the CMS has tremendous potential. I have been involved in international negotiations for many years, including the Kyoto Protocol, and I know how difficult it is to arrive at agreed language in this international environment these days. We are working on a post-Kyoto Protocol for 10 years now. We need to look at some of the older conventions. There is some very unique language there that we just could not negotiate today. I think we could get a lot further in implementing conventions like the CMS, we could get a lot further [than by] trying to negotiate new treaties or new instruments.

We are unique in that there are only two species conventions out there, there is CITES and there is us — we like to think of ourselves as the international wildlife convention. We deal with a number of very iconic species, a number I mentioned in my introduction. We have strong obligations. We are not like a broad, abstract convention; we are on the ground, we are operational, and we are trying to implement measures at the national level. This is something that is very unique to the CMS, we are also a very flexible convention.

We have developed these MOUs that I just mentioned. MOUs are an opportunity for range states to get together to try and manage a species. As I said, it could be one species or it could be a family; it could be a global or a regional setting. These are what we call the MOUs. Interestingly enough, you do not actually have to be a member of the convention to participate in an MOU. The

U.S. is a very good example of that. The U.S., for example, participates very actively in our shark MOU, and it is in fact — it goes back and forth between Germany — one of the biggest, or the biggest, donors to the shark MOU, and it also works very actively in many of our turtle MOUs. I think the U.S. finds the CMS an interesting instrument because it is very difficult in the United States to get something past the Senate and ratified. But the MOUs don't need to be ratified. It allows them to work in a framework with their conservation partners to actually get effective conservation measures moving.

We also work very much on action plans and what we call concerted action plans. I am going to talk a little bit later, we are hoping to develop a concerted action plan where we prioritize conservation strategies for the European eels. But these are just some of the other types of plans that we have. There are dozens of them. We just recently developed one in the Pacific — the Pacific Loggerhead turtle action plan, that involved all of those countries, some of which are member of the CMS and some of which are not. We work very closely with other initiatives, conservation initiatives, this just gives you an example. We work, for example, on the management of bird flyways; in this hemisphere is quite challenging, these days. I think in the old days it was very easy to get cooperation between the U.S. and Canada, and then the Latin American countries and Caribbean countries fell in line. I think as they developed further, they have their own minds of what they want, and so some of the traditional frameworks of the past are not as effective. I am actually starting to discuss with the Canadians that you put a lot of emphasis on all of these different frameworks — Inter-American Sea Turtles Agreement Coastal Birds, WHIMSI, all of these different frameworks — and they are not cheap, they come with a price tag. I am trying to discuss with the Canadian government that perhaps joining the CMS might be more cost-effective for your international cooperation and all of these different frameworks that they have been participating in.

I am going to talk a little about the European eel but I do not think I need to spend too much time because Alan [Walker] gave us a very good overview yesterday. Basically the European eel was listed on our Appendix II last year. I think it was a good species to be listed because it shows the diversity that the CMS has in terms of not just birds and turtles that we are better known for, but other species, fish species. It is actually our second fish species. We have — well, we do not include sharks, but we have sturgeons on our appendices. . . .

I just want to talk a little about the threats. The threats are very similar to the ones that we are seeing in terms of the American eel and the presentations that have been made over the last couple of days. We also see fishing, over-exploitation, but it is not necessarily the primary problem. We are actually pretty interested to understand a little bit better, what are the IUU (illegal, un-reported, under-regulated fishing). We do not have a very good understanding of that in Europe right now. We have an export ban in Europe but none of that applies and we don't have very good regulation at all within the North African countries. So we are hoping, we have been discussing with David [Freestone], Matt [Gollock], and Alan [Walker], the possibility of maybe doing an economic analysis with the European eel. We work very much on barriers to migration, it is a large problem in Europe — 24,000 hydro power plants, 4,600 water pumping stations just in the Netherlands. Alien species are of course being highlighted. Climate change, another major problem for the migratory route of the European eel. And, of course, predation.

The CMS has a role in many of those threats. I want to go over what we can do for the European eel. We find that many of the threats that are facing the European eel are those that are facing many of our other species, particularly when it comes to climate change, barriers to migration, and illegal killings. We have done a lot of work on barriers to migration in the terrestrial

context. We have developed guidelines to help countries mitigate the effects on barriers, particularly on the design of infrastructure. We just had a very interesting workshop in Mongolia about 6 weeks ago. Mongolia is going through a major transition right now and major development going on – new transport routes and huge mining going on. The government was very interested to sit down and discuss the guidelines that we had. We worked with them to put together a stakeholder group which included government officials, but also international banks that are investing in Mongolia and also local corporations that are involved in mining and transport. We were able to discuss some of the issues that are important in terms of our species, and how they might be able to apply the guidelines. It is a good example of the kind of work we can do, as a U.N., international treaty; we can develop these tools internationally, but then we can also deploy them in a very neutral way, sit down with different parties to let them understand just how important some of these issues in terms of migratory species are. A lot of them were not aware of it and in fact, they are very thankful afterwards. Of course the government is interested in seeing how they can develop that into providing regulations and legislation at the national level.

We have worked on invasive species and climate change. We have had working groups within our Scientific Council. We just developed a climate change work program. And we have also set up guidelines for alien species.

There is a lot being done in Europe, as Alan [Walker] has mentioned and Matt [Gollock] has mentioned, in terms of European eel protection. Europe has already made, I would say, very strong strides forward in protecting European eels, including the legislation adopted in 2007, the fact that it was listed on Appendix II of CITES in 2009, in 2010 the U.N. banned all imports and exports from the E.U. There is a co-relation with the export ban to perhaps having an impact on the American eel market. So, there is a lot that has been done, including that there are now about 81 action plans that have been developed by countries across Europe, at different levels of government.

You might ask yourself what can the CMS do in addition to that? For a species with such a wide range, including transboundary water courses, coordinated international management is very challenging, even within the E.U. There are a number of range states, though, that are not included in this, and these are the North African countries that we need to think a little bit more about. The North African populations are poorly understood in terms of their role in the range state management and there is virtually very little monitoring and management programs within these range states. This is certainly something we have been thinking about.

Range states need to recognize the importance of the Sargasso Sea as its breeding areas. And so a vital link in preserving the species back to Europe and in North Africa; we need to make that link and make it understood with policymakers much more. Range states that are neighbors, either with contiguous boundaries or transboundary river basins, should discuss cooperative management and conservation actions. At present, there is very little coordination between these countries. So, this is another area we are hoping to further.

This is some of the things we can do for the European eel. We have a very strong Science-Policy Interface. We have a Science Council that every country can nominate a science expert to. Then we have a COP, appointed counselors on different areas of our work, on by-catch, on birds, on fish, on sharks. This Council is very important because it can actually develop policies, or if countries have policies that they want to develop internationally, it can go through the Science Council and it can get the best advice. It also works very closely with IUCN and other international expert groups. Once it goes through the Scientific Council, as did the European eel proposal that Matt [Gollock] wrote for the listing, it is vetted there and discussed. It provides a good basis that

is scientifically sound when it comes to be discussed at the Conference of Parties where the resolutions are adopted. We are hoping, as I mentioned, to work on a concerted action plan, where we try to look at some of the problems that I just mentioned in the previous slides and see how we might be able to develop an initiative that can focus our work and, sort of hardwire some of the priorities into the strategizing for the conservation of the European eel.

This is a big one – I know from a lot of our work in terms of sharks and cetaceans and turtles, that really to get an implementation at the national level, you have to do capacity building. Of course, this is not something we are targeting in European countries. But, in terms of the North African countries, definitely there would be a lot of capacity building that would be needed. We would be thinking maybe in terms of what type of legislation development we could do — maybe working with them to beef up their EIA and things like that.

Another element that the CMS will be very important to the European eel, is that it will offer a holistic reporting framework where countries will be expected to report on the entire population of the European eel. So not just the European E.U. member states but all the other countries within the range, and I am speaking here mostly on the North African countries. When we identify problems within either the Science Council or member states raise it, we are able to work in specialized working groups to be able to solve key problems. So it offers a very strong international form for discussion and for problem solving, where management of the species cannot be done by one state; it has to be all states coming together.

I want to make a few concluding remarks here. I look forward to the work we are about to undertake with David [Freestone] and the Sargasso Sea Commission. We are hoping, next year, to have an international symposium where we can start to think about what are some of the major priorities we could undertake. We would like to feed that into our Scientific Council and then come up with a good strategy on moving forward. So, even though eels being listed since last year, we have not really done as much as what we should have. We are really starting to embark on that work right now.

I would say the American eel faces many similar threats to the European eel and so I think that we could actually look at the CMS as a possible governance framework for managing a species like the American eel.

I want to come back to something that I said at the beginning at my presentation and that is that I understand the politics here in the United States and perhaps even Canada in the last administration, that it is difficult to join international treaties. But, the CMS actually offers a large degree of flexibility in terms of the MOUs that we use, [that] allow different states to work together, use the full package of the convention – reporting, the convening power, the Scientific Council, and many other things – without actually having to go through a ratification process. It might be an interesting, innovative, and flexible institutional framework that you might want to consider for managing the American eel. It also, even though the U.S. and Canada are not member states, many of the Latin American countries and Caribbean countries, that James [McCleave] showed us on the first day, are indeed members of the CMS.

With that, thank you very much. David [Freestone], I really want to thank you for inviting me here. It has been a great experience the last couple of days. I have learned a lot here. I am really impressed at the level of interest in this particular species, which you can say honestly it is an iconic species. Thank you very much.

**POSSIBLE FUTURE SCIENTIFIC, LAW AND POLICY DIRECTIONS: WHERE DO WE GO FROM  
HERE?  
SUMMARY DISCUSSION WITH PANELISTS AND OPEN DISCUSSION PERIOD**

**David Freestone:**

The first thing is to take some questions. Are there any questions on what we have heard or issues that have not been raised. Jenny, you raised something with me [already] that I think would be really useful for us [to hear].

**Jenny Sun:<sup>6</sup>**

Starting from last September, there are four major Asian countries – Japan, China, Taiwan and South Korea – that already agreed to cut the eel procurement by 20% for Japanese year. . . . And in addition to that they are not just controlling the procurement each Japanese year by 20%, they also actually have an agreement holding the production for importing any of the American or European eel or other type, other than Japanese eel, on average, over the last three years. So, the total allotted for the next fishing year is actually starting from last November, it is the first year they kept track of it and also the following year carried on that limit. For Japan this year, the total allotted limit for procurement for the Japanese year is about 78 Metric Ton, and for all other type of eel other than the Japanese eel, is 50. So, each country has a limit according to the average of the last three years. And they reached the agreement last September among all four major countries. The idea is cutting 20% of their farming capacity, their limit in able to reach conservation.

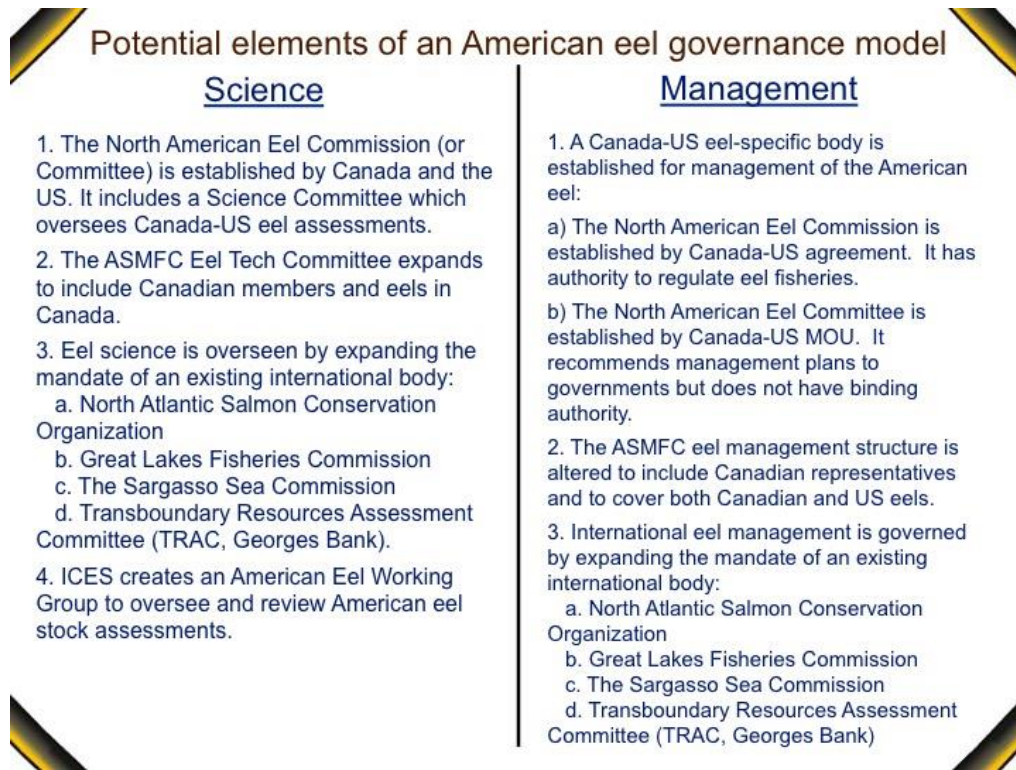
**David Freestone:**

Fantastic. So, we [have been talking] about [control of] supply, but this is essentially demand being reduced. What I should say is that David Cairns put [Figure 1] together last night and we thought it had some really nice ideas. Perhaps we could look through and make some suggestions and comments on them. They are alternatives.

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<sup>6</sup> Senior Marine Resource Economist, Gulf of Maine Research Institute.





*Figure 1. Potential Elements of an American Eel Governance Model.*

**Matt Gollock:**<sup>7</sup>

I think the points regarding the Canadian-U.S. collaboration are great. Why we are not given the opportunity to try and reach some of the southern regions as well, because clearly they are increasing in importance – so Haiti, Cuba, Dominican Republic. If something is going to be established, do it right. Now that can potentially make it harder, but, if it is going to happen, bring them in to begin with rather than after the fact.

**David Cairns:**<sup>8</sup>

I can make some remarks just to preface where this comes from. First of all, it divides the governance function into two parts: the science to the left, and the management to the right. I would note that a common way that governance is set up for fisheries is that there is a management body and there is a science function which feeds into the management body, something like a parent-child relation. So some of the bodies in the right column would be the parents of children on the left. The intention of this is not to put forward models that we would just take home and try to implement but rather to stimulate discussions, on a straw man kind of basis.

The first item which appears as number one on both sides, a Canada-U.S. eel-specific body. And to address your question, Matt [Gollock], I think there is a universal recognition that really the long goal would be an agreement or arrangement that would encompass the entire range, but I think there is also recognition that that is quite difficult to achieve. Compared to the U.S. Bilateral

<sup>7</sup> Chair of the IUCN Anguillid Eel Specialist Group, Zoological Society of London.

<sup>8</sup> Research Scientist, Department of Fisheries and Oceans.

Agreement is much closer and more feasible and might serve as a stepping stone to a longer term goal. . . . In the first column the North American Eel Commission and the second one with the North American Eel Committee. We have heard some talk about MOUs and conventions and treaties and so on – those are set up as two separate options, but it is not really a dichotomist choice I do not think. The first kind of model would be something that is set up by some kind of formal arrangement, possibly involving ratification by a legislative body. We know that [that] is quite difficult. But nevertheless . . . would have binding authority to manage fisheries; perhaps give a stronger hand to conservation. The second one would be a simple committee established by MOU. It is easier to pave because it does not require prior ratification, but it would only have advisory power. And there is sort of a continuum of options between those two extremes, between a strong-hand and a sort of weaker-hand, with the recommendation role. The other options that are thrown up there are various bilateral organizations that already exist. The proposal would be to modify or adapt or alter their mandates in some way to cover the eel model.

**Jeff Thaler:**

. . . To get people thinking, all those are really good goals, and a lot of what was said this morning are different programs that sound like they are underway, or things that are working to varying degrees of success. [However], as John [Dettmers] was saying, based on my experience on a number of policy issues, I see science feeding into policy, feeding into law. Unless, as John [Dettmers] was saying, there is a sense of urgency or of a crisis or some degree of certainty of the science, the policymakers and the lawmakers will not move. They will not act. If you read the [Findings and the] Biological Report [that go with the] listing decisions of U.S. Fish, in my view, a lot of it [suggests that] there is not enough data. There is too much uncertainty for them to take a position if they do not take a precautionary approach, and because the precautionary approach is not built into U.S. law and is not built into many jurisdictions' laws, you are not going to get a lot of [the protective measures] implemented absent some fire underneath there.

[Thus], I go back a little bit to the science question: if you were to have to prioritize where you are going to spend your money and time in the next two to three years addressing all these different stressors [or threats] we talked about, [in order] to then move towards [developing effective] policy and management – which [ones] are the highest priorities, stressors, or threats that science can say, “these are causing the most problems, these are depleting the stock the most, these are what are causing the animals to disappear”? Because unless you can answer some of these science questions, the regulators in the room (and not in the room) [are unlikely to act]. It is going to be a lot harder for them to act, or to develop or agree to any of these regimes, or legislators or senators or others in the U.S. or elsewhere [to do so]. I just want to throw that out there. I think those are all good goals but the problem is how do you get there? How do you motivate people to move there given the current state of science and knowledge?

**David Cairns:**

If I could address that, I would not be quite so pessimistic. If you read the U.S. Benchmark Report of 2012, there is a rather large dose of uncertainty in that report, and nevertheless, we see the U.S. taking quite serious action, on some fronts, to constrain and restrict eel fisheries in U.S. waters. To answers your question about priorities of science, I think the study that Gail [Wippelhauser] is undertaking here in Maine is really a key to try to establish the mortality

schedule of these animals over their life cycle. It is really key to understandings the impact of the elver fisheries in the U.S. and Canada. The question is, if mortality is very, very high in those early stages, perhaps we can take those elvers and there is no impact on the stock or on the population at all, but we do not know that. This kind of detailed study would potentially address that. But, I think there is enough conservation sentiment amongst managers and regulators that good things can be done, even waiting for the results of that kind of work.

**David Freestone:**

. . . I am actually really impressed with the . . . way [in which elver harvesting is being controlled in Maine]. I was completely wrong [in my previous impressions]. . . It seems to me that if I lived in Maine, I would be looking more at trying to raise eels and eel farming in Maine rather than sending them to China. So that there [would be a strong,] domestic, sustainability aspect to it. [This would open up the possibility of deliberate] captive-release, like escapement programs, [which would actually] enhance the stock; [something that does not happen if they are sent to the Far East.]

Given that this is all driven by the international market, I thought you would be very interested in the figures Jenny [Sun] had. I still think there is a case for a CITES listing for Appendix II. [This would require reporting by both exporting and importing state.] The [collection] of data [involved would be] actually be a really helpful first step, I think. I was asking Bradnee [Chambers] whether, given that neither the U.S. nor Canada are actually parties to the Convention of Migratory Species, . . . whether there is a role for CMS? We are running forward with the European eel, but we could bring the American eel [agenda] aboard with that, right? Do you want to make some comments on that?

**Bradnee Chambers:**

Yes, maybe just to follow up on my presentation. It seems to me that many of the management regimes that you have are North American. And they do not include the Central American countries and the Caribbean countries. So, I would argue that there would be a role for us to play there, given our experience on other species. Just because the U.S. and Canada are not member of CMS does not mean they could not propose an MOU under the CMS. That could include some of the other countries that Matt [Gollock] just mentioned also. Once you do that, then there are all sorts of things you can do; the sky is the limit. I gave you all sorts of examples in my presentation. I do not think the Law of the Sea is relevant . . . if you want to create a regime of international cooperation to manage and jointly share a species; the CMS is probably more relevant. Certainly, in the trade aspect CITES is an important treaty. You have the trade side from CITES, but I think from the conservation side the CMS might offer a type of plausible, international, environmental governance regime that could be affordable and is easy to politically implement. And you can think of all the other elements that can come under it that are needed.

**David Cairns:**

What I would take from your comment is that we do not need to stick with a single body, a single model. There could be a bilateral agreement between Canada and the U.S., and CMS involvement – the involvement of perhaps several other international programs and agencies.

**David Freestone:**

One quick point on CITES. Even if we think the U.S. and Canada have a handle on elver harvesting, clearly the Caribbean countries have not. So a listing under CITES might actually bring that under control.

**Barry Costa-Pierce:<sup>9</sup>**

Speaking on both sides of the issue, particularly the fisheries data that was presented. I still have major questions about the sustainable fisheries route and what the next 50 years [are] going to look like.

As I mentioned, I just came back from Iceland and Greenland, and it is very clear from the scientific data that species such as these are moving rapidly. I think there are some major holes in the science. Like Mike [Waine] presented and the NAO data that was presented, one looks at that as possibly cyclical, that there are some cyclical aspects with the NAO and other fisheries issues that still needs further examination. Before we start putting a major hammer on the fishery I would want to look at the latest international data, as well as the trends that are occurring in Greenland and Iceland and Norway, *et cetera*.

On the aquaculture side, I think what Jenny [Sun] pointed out is really important. When we were in Asia a few years ago, there were models of community – based sustainable eel aquaculture that were not capital intensive, like completely circulating aquacultures systems that you saw in the Netherlands, Denmark, *et cetera*.

I am going to ask the larger question here about aquaculture and fisheries. Clearly, elver aquaculture has exerted additional pressure on this species. And the major driver of that is Asian export market, so we cannot exclude Asia from this equation because a lot of the elver fishers in Maine are depending on that. There has been a birth of new socio-economic model here that potentially is extremely important for rural areas of the Dominican Republic, as well as Asia. So I really think we have to think about that route also – can we make elver fishing a sustainable economic model for indigenous nations and also rural economic growth – a larger question.

One of the things that disturbs me is that aquaculture seems to be continuously left out of the equation with fisheries. I would pose the question, if aquaculture in Asia has exerted a major new pressure on the potential future sustainability of this species, globally, than can we actually work together between aquaculture people and fisheries people and policymakers to actually pose a new hypothesis — can the birth of a new sustainable aquaculture model take pressure off the species? I can give you any number of examples. I am not talking about salmon. I can give you other species in aquaculture where that is absolutely true where the aquaculture toolbox is being used to restore coral reefs, seagrass beds, submerged aquatic vegetation, *et cetera, ad infinitum*, across the planet, as well as here in Maine, we have major aquaculture hatcheries restoring wild shellfish fisheries. I think we have to think broadly across that scientific perspective. I think the question posed about what is the major scientific driver. To me, it is elver fishing and that the Asian market that is driving all this.

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<sup>9</sup> Henry L. & Grace Doherty Professor & Chair of Marine Sciences, University of New England.

**John Dettmers:**<sup>10</sup>

I think that what I am hearing out of this discussion, is that we are trying to, essentially, land on some form of a process that includes adaptive management. There are [many] uncertainties out there. Nonetheless, managers make the decisions in the face of uncertainties all the time and that is the beauty of adaptively managing. As long as you have integration of science and managers working together to say this is working, we are filling information gaps, we are eliminating hypotheses. So, if I think about next steps, I observe that ASMFC has to do a stock assessment, re-evaluate its stock assessment in 2017. Wouldn't it be great if a goal would be to do at least a Canadian and American joint stock assessment at that period to start to bring congruent information together? And then that allows managers to have additional discussions about what those data mean. It might not be fast enough for some, it might be action that is too fast for others, but maybe that is a reasonable step in looking to integrate science and management. The question is how willing are our parties to jump into that sort of approach, because it means extra time and effort, and money, and there are existing processes already in play.

**David Freestone:**

It does not need a new instrument [to foster this collaboration], you could just do it. Most of the people in the room are actually involved in that. So it would need the will to do it. That could be great avenue.

**Mitch Feigenbaum:**<sup>11</sup>

First, I had a very quick question: is Haiti a member of the CMS?

**Bradnee Chambers:**

Haiti is not, no. But, we are getting new membership from [the Caribbean]. We have a workshop that is going on there in a month, and we are expecting Haiti and some of the other outliers to join us.

**Mitch Feigenbaum:**

I do want to just signal my agreement with David's point that in terms of trying to integrate management, Canada and the U.S. are important, obviously, there is great potential for shared work, whether it be stock assessment or taking on new research projects. But when we cut through all the uncertainties there are a few things we are certain of. I think everyone is aware that poaching as a threat – it is not only a serious threat, but it is a growing threat. Whereas fishery management – fisheries is a threat but we know we are working on reducing the catches. Habitat restoration – we know the threat and we know we are making progress on that threat. But when it comes to law enforcement and poaching, we are really not making progress – things are getting worse. Because of what I do – as someone in the industry – our first reaction to this appendix is that, are you

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<sup>10</sup> Fishery Management Program Director, Great Lakes Fishery Commission.

<sup>11</sup> Director, American Eel Sustainability Association.

kidding me, another review? Another assessment? We have been through five or six stock assessments or endangered species reviews in the two jurisdictions in Canada and the U.S. When anyone asks, “why we don’t have aquaculture here,” that is your answer, pure and simple. No businessperson in their right mind would invest ten cents in aquaculture in the environment that has existed in the last ten years. There are people in this room that stand ready to embark on that project as soon as the management conditions are right. We do think that – I do not speak for all industry but I speak for a good share of the industry and I would say that the industry is open-minded; we just are not going to knee-jerk reject the concept of CITES II or CMS Appendix II, because we know that the poaching that is emanating from foreign countries is very, very substantial.

I look at the chart of potential elements of an eel governance model, and really, we talked about a parent-child relationship, the allegory of the management side being of a parent-child, suggests that law enforcement is maybe the forgotten step-child. . . . I would ask everyone to consider when we think about how much money is going into stock assessment, endangered species review, international symposiums, ASMFC proceedings, DFO eel working group, Canadian eel science working group . . . . I know it is money well spent – but, we have to ask: would the money be better spent if we were giving money to our law enforcement agencies to actually enforce the laws and the policies that we are successful in implementing?

In 2012, before the gold rush started, those of us in the industry knew the gold rush was coming. We were aware of the prices that were existing in the japonica fishery before our season even started. We summoned fish and wildlife executives to meet with us, to talk about the season that was coming. We knew the names of poachers that had come from overseas and established locations. The response we got was there are two federal agents in the State of Maine for all fish and wildlife services. And if we wanted to draw on additional resources from the New England region, unfortunately all those resources are already devoted to rhinoceros cases — very big priority and understandably so. Basically, you have one or two federal agents trying to enforce the law in what turned out to be a 40 or 50 million dollar fishery. So, until law enforcement is up there, and I realize CITES II will create a tool for law enforcement, but if the tool is not being used, it is really just paperwork.

**Mike Waine:**<sup>12</sup>

I was going to follow-up on what John [Dettmers] said. This makes sense to me. What Mitch [Feigenbaum] said makes sense to me. You can see how this quickly becomes more and more overwhelming. I am not too concerned about the interests. I think David is right – David and John mentioning we constantly make management decisions in the face of uncertainty; we do it all the time. There are great examples, we heard about them today. I think that the interest is there.

From the commission standpoint, and know that, basically, just to give you an idea of the governance, our management board would be the ones to make any of these decisions, of which I interact with directly. But I think that this is something that we picked up – the science side of things is something that we picked up on, we have worked a little bit on, but then it seems like it got dropped – not dropped, but other things took priority. Revisiting this is where I see us, as being where we are at. From my perspective, I think we are still in sort of an information gathering phase. I think this is great, the contacts that we have made, and I plan to follow up to get a better

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<sup>12</sup> Senior Fishery Management Plan Coordinator, Atlantic States Marine Fisheries Commission.

understanding. Ultimately my perspective would be to try and package this in some way to present to our board so that they could get caught up to speed on where we are at coming out of this symposium. I think that is fairly realistic for early 2016. Not that we are going to obviously have a decision, but getting the ball rolling and moving forward is something I planned to work on in 2016 regarding eels. So, just trying to provide a little perspective from the commission standpoint.

**Matt Gollock:**

Specific question – with the introduction of the swipe card, my understanding is that poaching has dropped enormously, but is there a sense that the poaching effort has shifted somewhere else?

**Mike Waine:**

There is concern — I will jump in, Mitch [Feigenbaum], and you can comment as well. Geographically there was a ton of adjacent issues with states that are bordering and neighboring Maine. Mitch [Feigenbaum] makes a very good point that law enforcement is resource-[limited] and agent-limited. Probably is the case everywhere for all of our species. We have done a good job of trying to make advancements in the penalty structure. Because, as people talked about — the penalty was almost the cost of doing business because the price had increased so much. I think that the law enforcement model relies on making examples out of few, because they are not catching everybody. So, that was the idea and theory behind increasing the fees and the jail time so that, if examples were made, that word would spread and, ultimately that would help decrease some of the poaching. We do review this through our law enforcement committee from the commission side of things. It is something ongoing, yet, here came this huge gold rush and we are scrambling, trying to catch up with a fishery that is vastly progressing, quicker than we could address it. But we are putting through steps to do so.

**Mitch Feigenbaum:**

My quick response would be that there is no question that illegal activity spiked in 2012 and 2013. But, anyone who has been in the fishery for a long time, like Darrell [Young] or myself or Carey, we will tell you that poaching has been an issue and a serious issue since the 1990s. And it was really the profile of the issue, because of all the press and profiles about the price that sparked so much public attention, and really the threat of ASMFC action against Maine, that seemed to motivate Maine to implement these measures. But, the poaching, has it shifted? I see no evidence of poaching in the areas of Nova Scotia where the glass eel fishery takes place, and the reason is very simple. It goes back to that supposedly “conservative principle,” that when you let private enterprise actually have a lasting right to a share of a resource, there is no one better positioned to protect it than them. When Yvonne [Carey] and Genna [Carey] reached their quota on any one of their rivers, they continue to send their crews out for the rest of the season, until the last of the fish have run; to police their own river. I do the same thing and many of our colleagues are doing this. So I do not think it is much of a problem. Where is the poaching going on? I do not even know if it is poaching because the law is so unclear, but it is all going on in Haiti, Dominica, and Cuba right now. That is the issue. [Foreign countries] are very candid about the fact, they’re not saying

“we are going to Cuba and Haiti to poach,” they just say they are going to Haiti and Cuba and the Dominican Republic to get every last eel that we can.

**Steven Shepard:**<sup>13</sup>

I have heard a lot that makes sense and I think the idea of a management concept makes sense to be pursued. I think, in general, the thirteen states of the Atlantic States Marine Fishery Commission have their house in order under the leadership of ASMFC. I think . . . I have read everything Canada has published related to COSEWIC and everything they considered. I think Canada has their house in order. DFO has managed to get its contracts in place and programs that allow, perhaps for a similar sort of stock assessment and framework that ASMFC does and comparable information could develop.

I think where the gaps are, as Mitch [Feigenbaum] just pointed out, are in the Caribbean. Getting back to Jeff [Thaler]’s point of science driving policy and management and ultimately law – we do not have a fire to drive us through those stages right now. Perhaps we could create such a thing, but there is a basic information gap in the Caribbean, and I would suggest not only in the Caribbean but also in the Gulf States, in the Mississippi Basin. We do not really know where the eels are in those places, how abundant they are, we do not even know if the adults leaving those waters contribute to the spawning. There is a lot of science in that area to bring that whole part of the range up to the same level of information to say in the United States and Canada. So I have to think a monkey wrench into things, but if you accept the premise that we have to develop good science to drive some sort of overriding issue that has to be resolved, and get that to management and policymakers to make decisions, and new laws you need to create different bodies to govern eels, those are tough steps.

**Bradnee Chambers:**

I want to make the observation, I know that most of us are from Canada or the U.S. and we are looking at it from that perspective. But this is a really complex range. It involves the high seas; it involves developing countries where laws are not being enforced; it involves two large countries with divided jurisdictions on eels. This speaks to having some international framework if you are going to be effective. How are you going to enforce in Haiti or the Dominican Republic and those countries without working through an international regime? It is screaming out for international cooperation as far as I can see.

**David Freestone:**

Do you think, [even though] the U.S. and Canada are not parties, [that] they could still collaborate through the framework of the CMS?

**Bradnee Chambers:**

I just want to add that the Sargasso Sea is a very interesting high seas area – the CMS applies to the high seas. But also, we have been discussing the idea of perhaps working with some

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<sup>13</sup> Maine Hydro Licensing Coordinator, U.S. Fish & Wildlife Service.



of the other international frameworks to make the Sargasso Sea a high seas protected area. So that is an added dimension that you can benefit from embracing an international regime approach to this.

**David VanderZwaag:**

Just to pick up again [on the] bilateral part of [cooperation]. We have seen a lot of good management efforts in both countries. In science, we obviously see gaps. So, there could be some [bilateral] follow-ups like we [have been discussing] here.

But, I think – maybe this is coming off of Mitch [Feigenbaum]’s point – if you really want political will to act, you may need [to highlight] some sort of crisis. And when you look at it, [there does appear] to be a conservation crisis emerging in the Caribbean region. Given the broad [eel] distributions, we just do not know what is going on down there even in terms of the science. [There is also] the ecosystem approach [urging the management of species based on ecosystem boundaries].

[Future cooperation might, therefore, follow various paths. A starting point for building broader regional cooperation might involve the convening of a workshop, perhaps under the auspices of the Sargasso Sea Commission and involving Caribbean representatives and NGOs, to discuss the issues and consider possible future directions for scientific and management cooperation. Such a workshop might help develop a sense of political urgency and assist in setting a political action agenda. Broader cooperation might also be facilitated. For example, American eel might be listed on Appendix II under the CMS and a new MOU for the conservation of American eel might subsequently be negotiated. However, Canada and the United States, not being parties to the CMS, might prefer proceeding independently to develop regional and bilateral agreements or arrangements.]

**John Dettmers:**

David [VanderZwaag], I agree with what you are saying, especially about the idea of urgency, and I guess I am coming back to David Freestone’s notion of a several minutes ago – what about a CITES Appendix II listing? Is that something that is worth talking about in more detail and would that create the necessary level of urgency in the Caribbean? In Asia? As sort of an open question to the group.

**David Freestone:**

We have a lot of really good [information and ideas] here. Although I do not think we are [yet] in the position where we can actually come to agreed conclusions [for the Workshop], but we can pull this into some key things we have identified as being important.

**Mitch Feigenbaum:**

My final points. I go to a lot of meetings and some of you have heard me make this point in meeting after meeting. There is a lot of cynicism on the part of the industry that sometimes we are an afterthought; sometimes we are not really asked to provide information for assessments. We are very concerned about this fishery and eel management. One of the things I try to point out is

that our voice might not carry so much weight when talking about science and management, but it's become very clear in all the meetings that I have going to in over a decade, that the key to success in the long term is really getting political buy-in for the recommendations that we make, whether it is AMFSC or this commission or that group. That is where industry carries a lot more weight than we are possibly, potentially given credit for at the meetings.

I really respect and appreciate the fact that I have gotten a chance to speak here and I thank everyone for listening to my rant. But, I am very — not just me but our industry — we are very well organized, and we are pretty well connected. In our follow-up conversations, and I have spoken to some people in this room, we want to learn more about CITES II. Again, it is not just a knee-jerk “no, we are against it.” And, if industry buys into CITES II listing, I dare say that we can rally the industry support to get behind that that all the scientists and managers in the world would have a hard time matching. So, please do not assume, never just assume that just because it is industry that our goal is obstruction — that is not the case.

My final point is, one of the handouts was titled or subtitled, “What Can We Learn From the European Experience.” I just want to point out that I have had the opportunity to look at the most recent report coming out of traffic about *anguilla* species and *anguilla* species around the world. This chart has demonstrated that in the Modern era, between 1998 and 2008, the Europeans within Europe harvested 77,479 tons of adult eels; that averages somewhere around 8,000 tons a year. In the U.S. as you have seen, we are pretty well-capped at — in North America, U.S. and Canada, combined, we are pretty much stuck now at under 1,000 and for decades and decades, we have not really been any near even 3,000 tons. Likewise, we know that from 1998 to 2008 the Europeans harvested 776 tons of glass eels, in that ten year period, averaging 77 tons a year. You heard the presentation from Laura [Hussey-Bondt], as well as the presentation from Mike [Waine], and you now all realize that the total catch from the U.S. and Canada combined rarely exceeds 12 tons and in the future it is now capped to be guaranteed to be under 10 tons. I would dare say — this is not just funny talk — we have learned from the European experience, you better believe we have learned. This is not just the last week or the last month. But for years, industry, management, and science has been going to ASMFC and our big message has been we have to make sure we don't do what the Europeans have done, and maybe the Europeans now ought to take a look at what we are doing, and maybe they can learn from our experience. Thank you.

**David Freestone:**

Thank you. That is really [helpful] because lessons, of course, can be both good lessons and bad lessons. But in terms of regulation the Europeans are now moving ahead. This [session has been] really interesting, but I think we had probably better wrap up [now].

[It is clear that] we have had all the right people here. This has been one of the most enjoyable, stimulating meetings we have convened. So thank you all for coming, for those who spoke, for those who gave presentations, but also to those who contributed to this as well. We are looking forward to the proceedings.

Thank you all very much.